
AMS
AMSTERDAM
INSTITUTE FOR
ADVANCED
METROPOLITAN
SOLUTIONS
Annual Report
2019

Annual Report 2019

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Contents

Reinventing the city

Like many cities worldwide, Amsterdam aims to be a sustainable city, for current and future generations. To achieve this ambition, AMS Institute plays a crucial role in initiating innovation and establishing connections between research and innovation, education and entrepreneurship. By realizing synergies between experts from various interdisciplinary backgrounds, the institute jointly creates scalable solutions to tackle the city's most pressing urban challenges.

Committed to urban innovation

Our ambition is to create sustainable metropolitan solutions by realizing cross-fertilization of ideas: in our research, innovation and educational activities, but also by creating an innovative environment where connections are made between knowledge institutes, private and public organizations. AMS Institute aims to develop a deep interdisciplinary understanding of - and create (technological) solutions for - the city, focusing on six urban domains: mobility, energy, circularity, food, climate and digitization.

Amsterdam as a 'living lab'

We use the Amsterdam Metropolitan Area (AMA) as our living lab. Living labs – a co-innovation approach that provides a setting for multiple stakeholders to jointly test, develop and create solutions for real-life issues – are important when it comes to designing metropolitan solutions that deliver long-term impact and transformations. On various locations throughout the city, we test and experiment towards sustainable solutions together with users, private and public partners, as well as knowledge institutes. Why? Because solutions that are co-created by all parties involved are better and can be adopted faster – resulting in truly improved living environments.

Core institute activities

To create impact for the city of Amsterdam, AMS Institute focuses on three main activities:

Research & Innovation: Our dedicated portfolio, that in 2019 consisted of 114 projects and programs, is developed and executed by interdisciplinary consortia of knowledge institutes and private companies, in cooperation with the City of Amsterdam and its citizen platforms.

Our Research & Innovation program is set up to achieve mission-oriented open innovation. The process to achieve this is distinguished by four different stages (each with its own set of activities):

1 Exploring and researching
2 Prototyping and validating
3 Building and launching
4 Starting and accelerating

Education: At the heart of AMS Institute's educational activities is the two-year master program Metropolitan Analysis, Design & Engineering (MSc MADE). Our master aims to provide innovative education and deliver excellent, interdisciplinary urban engineers with the right balance between theoretical grounding and practical skills to deal with the complex challenges of cities. Just like our MSc MADE targets and attracts top students from all over the world, our innovative Massive Open Online Courses (MOOCs), summer schools and professional training activities do so too.

Collaboration and entrepreneurship: We aim to propel innovative ideas, create impact through strategic collaboration within our network, and stimulate entrepreneurship. Plenty of opportunities for new business ideas arise from our research & innovation activities, education activities and collaborations. Moreover, our own entrepreneurship programs help launch and fast-track promising business ideas of start-ups on the topic of urban sustainability.

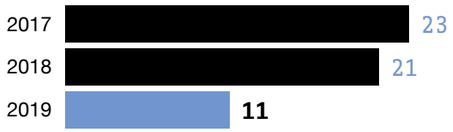
An internationally leading knowledge institute

AMS Institute was founded in 2014 by three universities: Delft University of Technology (TU Delft), Wageningen University & Research (WUR) and Massachusetts Institute of Technology (MIT). AMS Institute is an internationally leading knowledge institute. We design solutions for urban challenges and educate tomorrow's engineers.

Key Figures 2019

Research & Innovation

Projects awarded



Total value of awarded projects

Number of running projects

Smart Urban Mobility 12

Circularity in Urban Regions 13

Responsible Urban Digitization 12

Metropolitan Food Systems 14

Climate Resilient Cities 8

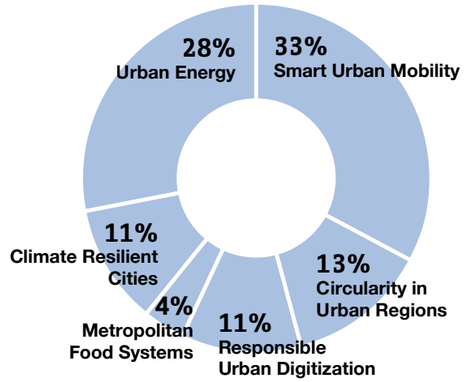
Urban Energy 17

Overview accumulated research portfolio

Total portfolio **114** projects

with a value of **€75.9M**

Please note: accumulated portfolio value is shown based on contract values and not on internal cost-price tariffs.



MSc MADE

8

MSc MADE graduates in 2019

36 new MSc MADE students

AMS M00C participants

11,500

New M00C participants in 2019

56,241 total AMS M00C participants

Communications & Outreach

	2018	2019
Facebook followers	2,170	**2,838**
Twitter followers	3,246	**3,834**
LinkedIn followers	1,661	**2,974**
Instagram followers	77	**704**
Total newsletter subscriptions	-	**1,434**
Press Total media value	€8.9M	**€13.0M**

Directors Report

In 2019 we celebrated the 5-year anniversary of our institute. An important milestone that allows us to look back, reflect and use these insights to define our future direction. Before diving into the highlights of 2019, we'd therefore like to take you shortly back to our foundation and the guiding principles on which we'll continue to build our institute.

In its search for solutions to its urban challenges, the City of Amsterdam was conscious of the need to introduce technological innovation and to attract technological talent to the Amsterdam Metropolitan Area (AMA). And so AMS Institute was initiated. The city itself, i.e. the built environment and infrastructure, changes very slowly and often with major investment costs. The heritage of cities, though, often provides the city's charm and attractiveness. Technology and IT develop very rapidly, thus causing swift and major changes for society. People's behavioral patterns adapt and change faster than the physical environment but slower than Technology and IT. We believe that people should be the leading perspective in every case. To blend the competing ingredients, innovation cannot be imposed on cities: it needs to be generated and tested within 'Living Labs'. These inclusive design spaces and testbeds are where citizens, academics, government, civil society and entrepreneurs can come together to co-create bespoke technological solutions and policies that can make the cities we love even better places to live.

An integrated approach on urban innovation

True societal transformation can only occur once we realize that innovation is not a matter of simply changing the metabolism, rearranging the components of a city (buildings, infrastructures, public space and the way they are managed), or thinking that we already have all the pieces of the puzzle on the table. What is needed is an integrated approach. Our focus is on urban innovation through research, education and collaboration & entrepreneurship. Our activities evolve around six domains: urban mobility, climate adaptation, urban food systems, responsible digitization, circularity and energy, and the integration of these domains. We are continuously developing our methodology to address sustainability challenges through various forms of co-creation and co-production of knowledge with a transdisciplinary approach.

Creating impact through collaboration

AMS Institute aims to work as a networking organization, initiating platforms with local and international partners, within a broad coalition of stakeholders, including academic researchers,

industry, civil society, policy makers, and affected communities. We value our unique partnership with the City of Amsterdam, and the Metropolitan Area (AMA) is at the core of AMS Institute. Together we recognize the fact that AMS Institute can mobilize unique forces and knowledge for the benefit of Amsterdam, the AMA and metropolitan areas worldwide. We continue to learn each day how to maximize the value of this partnership.

Highlights from 2019

Through research, education and collaboration & entrepreneurship we design innovative solutions *in* the city and *for* citizens, wherever people are pursuing bold ideas to create a world where everyone has a chance to thrive. Here are nine ways we made a difference in 2019:

- Conducting rigorous research with scientific excellence and independence, resulting in a portfolio covering 114 research projects with more than 100 public, private and academic partners in national and international consortia;
- Supporting changemakers to find and/or accelerate advanced solutions, testing them in real-life Living Labs in the AMA, adding a real-life use step to (fundamental) science, speeding up science to society wide implementation;
- Leveraging cutting-edge research technologies and data science resulting in initiatives and decision support tools for urban professionals, while also building up valuable aggregated data sets on which upcoming research can build;
- Understanding and tackling structural challenges for metropolitan areas, and the city of Amsterdam in particular, resulting in the development of a first selection of potential flagship projects for the coming years; for instance, the emerging program on ‘Future Proof Urban Assets’;
- Delivering accessible insights to influencers and changemakers by creating inviting content and events, building upon the rich portfolio and numerous outcomes of the research and education projects of AMS Institute. To give our experts and activities a better stage we developed a new website in 2019;
- Offering education programs at Master level and through professional training, in on-site physical settings. For instance, MSc MADE, summer schools and masterclasses, and online digital platforms, such as EdX MOOCs, reaching out to tens of thousands worldwide;
- Deepening collaboration with municipalities and communities within the AMA and beyond, adding a new kind of objective layer to foster debate in societal collaborations and alliances;
- Setting up cross-sectoral collaborations with selected partner cities, like Paris, Vienna and Helsinki, to achieve peer-to-peer learning and tackle the highest priority challenges—and do so in ways that ‘plan with, rather than for’ traditionally excluded communities;

- Realizing smart coalitions with innovative entrepreneurs and companies related to main research projects and upcoming flagships, like ‘Roboat’ and the Innovation Center Digital Mobility.

Celebrating a milestone

In 2019, we celebrated the 5th anniversary of AMS Institute. An important milestone, that also included an external evaluation to see where we stand out and what to improve. An international panel of experts carried out an important and above all independent five-year review of AMS Institute. The panel concluded that the institute has successfully delivered upon the development goals set, that it is a valuable asset to Amsterdam, and has developed into a leading institution with a ‘license to act’ that is relevant for years to come. Moreover, it acknowledged AMS Institute as an example of how to successfully ‘connect science to societal challenges’. Given our partnerships with the City of Amsterdam, TU Delft, WUR and MIT and our public and private stakeholders, the external evaluation regards AMS Institute as uniquely positioned as a thriving ecosystem, and a collaboration that has the right knowledge, skills and networks to create metropolitan solutions with impact.

Applying the insights from this evaluation, AMS Institute is stepping into the future to continue our mission of re-inventing cities. We believe that by conducting rigorous research with analytical excellence, combined with our independent perspective, we can unlock knowledge to help changemakers accelerate solutions. AMS Institute takes on the responsibility to address this in a methodological and innovative way, with the knowledge that data and cutting-edge research technologies play an essential role in finding answers to today’s—and tomorrow’s—diverse challenges.

Focus on research with impact

In our research portfolio we continue to strengthen the focus of our portfolio around six core domains: Smart Urban Mobility, Urban Energy, Metropolitan Food Systems, Responsible Urban Digitization, Circularity in Urban Regions, and Climate Resilient Cities. The overall project portfolio consisted of 114 research projects in 2019. These involved over 100 private partners, as well as academics and public stakeholders. The successful projects carried out within the six urban challenges make a major contribution to the external recognition for our work. This is reflected in publications, talks and presentations at international conferences, similar initiatives based on AMS Institute’s concept, and proposals for collaboration. We also took our first steps to define flagship projects within the research portfolio. Our aim here is to create more impact on Amsterdam’s most pressing urban challenges and focus on breakthrough solutions that enable system-level transitions.

Education as an integral part of our activities

We are proud of all the exciting developments within our education program. Overall, in 2019 the total number of MADE students rose to 80. The interest and attitude of our students continues to demonstrate a clear AMS ‘mindset’ characterized by critical thinkers, with entrepreneurial interest, skills and initiatives, and an open-minded approach towards finding effective solutions related to metropolitan challenges. In September the graduation of the first MSc MADE students marked an important milestone. The fact that all our graduates immediately found work in their fields, with a great spread between entrepreneurial, public and academic professions, is proof of both the societal and professional value of the MSc MADE.

The MADE Living Lab course for second-year students is one of the master program’s highlights where practice and theory meet. Their thorough research, collaboration, entrepreneurship and creativity come together in this course with an exhibit as closing event Another noteworthy element of the MSc MADE program is the elective ‘Under Pressure’ course and its successful exchange-collaboration with the City of Vienna and Bratislava and students of TU Vienna. This international exchange brings excellent learnings, great group dynamics and a rich output that has already proven its worth for the Vienna-Bratislava metropolitan area urban professionals.

AMS Institute’s education team also generated and elaborated ideas for new MOOCs, courses, summer and winter Schools and even a second MSc track within MADE. We launched our first series of ‘Professional Training on Urban Data Science’ for urban professionals from Amsterdam, Rotterdam and Utrecht, various courses and thematic workshops. For example, the design of ‘Sustainable Urban River Corridors’ workshop represented a mix of professionals and students from over 25 nationalities in a group of 32. It never fails to excite us that our activities create such an international pull.

Launch of Marineterrein Amsterdam Living Lab

Our ecosystem plays an essential role in everything we do from our home-base at Marineterrein Amsterdam. In 2019, together with Bureau Marineterrein, NEMO and Amsterdam Smart City/ The Amsterdam Economic Board, we founded the Marineterrein Amsterdam Living Lab (MALL). We are creating an inviting area with a supportive community and the ambition to develop into an inclusive urban environment, or breeding ground for innovations, where academics, public and private partners and citizens come together to exchange, develop and test new approaches to the many challenges metropolitan areas face.

Expert advice to drive change

2019 also marked the year that AMS Institute started a proper route for research and expert advice, building upon the expertise and outcomes of our founding partners, and respective Principal Investigators (PIs) and Research Fellows (RFs). We contributed to a broad range of projects: from sustainability advice for Amsterdam Haven-Stad (relating to Energy, Mobility, Circularity and Climate Adaptation), to advice on international projects to develop and manage Living Labs. For instance, in the European Lighthouse project 'ATELIER' a joint project of the cities of Amsterdam and Bilbao.

Adding the perspective of design thinking

Given the complex and interrelated challenges that cities face, it is important to think about what just cities should look like. And to ask: what practical steps can we take to achieve them, and what impact will they have? But it's also important to reflect on new routes and perspectives. Which is why in 2019 we incorporated more design thinking in our education and research portfolio, to test and imagine possible routes of development, in close collaboration with, among others, CleverºFranke and UNSense. We also further strengthened involvement from innovative consultancy firms like Witteveen&Bos, Metabolic and Space&Matter.

Responding to Amsterdam's urban challenges

Cities and the dynamics of cities are constantly changing. At AMS Institute we aim to be both agenda-setting and responsive to the resulting challenges that cities face. During the pan-European heatwave in the summer of 2019 researchers from Wageningen University & Research and AMS Institute launched weather balloons from Amsterdam's Dam Square to map the height of the urban dome. The research was featured in national newspapers and as opening item on TV news. It gave our researchers an amazing stage from which to share their expertise, helping to improve understanding of the urban weather profile and contributing to brand awareness and the reputation of AMS Institute.

In 2019 AMS Institute has responded to the challenge of the ageing of the city's bridges and historic quay walls – in some cases their conditions resulted in serious failures, which even resulted in having to close vital parts of the city for safety reasons. When the City of Amsterdam issued the challenge to improve the key infrastructure of its historic center, AMS Institute collaborated with the municipality to set the agenda to include innovation-based research. Working on this challenging task jointly with the City of Amsterdam and infrastructural companies (related to water, waste, energy etc.), we took the initiative to develop a new research and action roadmap, building upon our expertise related to future-proof urban assets. The ongoing process shows recognition of a key role for AMS Institute within an integrated, multi-stakeholder approach needed to address these kinds of complex and impactful challenges and trajectories.

People are the core asset of our institute

People are the core of our ecosystem and success: PIs and RFs, public and private partners and the institute's staff. Together we form the AMS Community and together we create impact. Our people are the heart of our institute, and we are proud of the passion, expertise and dedication they bring to their work.

Scaling up for the future

AMS Institute is following up on the external evaluation's recommendation to scale up the critical mass of the institute. This includes the first steps in 2019 by the core academic partners TU Delft and WUR, to secure investments in scientific positions that create a structural scientific core, locally at AMS Institute. Early 2020 AMS Institute will revisit its multi-annual strategy. We will be more focused than ever on scaling up our real-world contribution, measuring ourselves by our scientific excellence and the societal impact we create.

Join our journey

In 2019 AMS Institute proved how important it is for science to be an integral part of urban development and the major transition topics of the city.

The overview and vision presented in this Directors Report 2019 shows only a small part of what AMS Institute is and does. We hope you will enjoy reading the rest of the report for more highlights of research projects, teaching, courses, Living Labs, urban solutions and the role our partners play in all these joint activities.

We are confident that the Annual Report 2019 will help you understand how we work, and what we aim for now, and in the coming years. And we hope you will continue to work with us, or to join us on this exciting journey to find solutions that help construct a prosperous, sustainable, resilient and just future. We are happy to present to you the work of AMS Institute and all related partners of 2019.

Enjoy reading this report, and please join us on this amazing journey!

Arjan van Timmeren, *Scientific Director*
Kenneth Heijns, *Managing Director*
Stephan van Dijk, *Director of Innovation*

The AMS Living Lab Approach

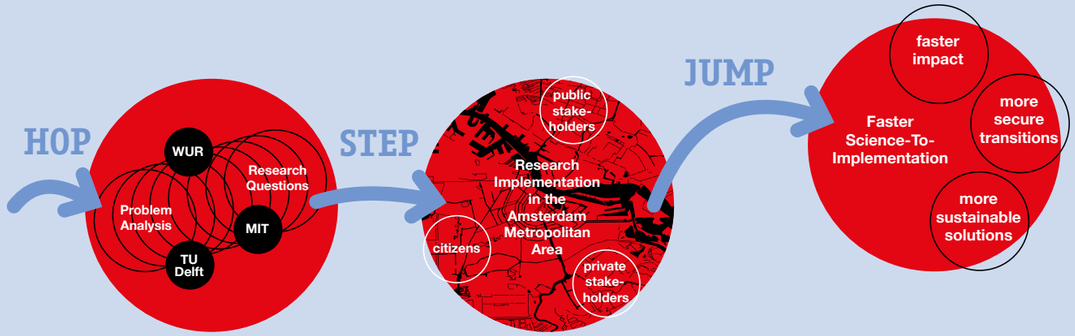
The multidisciplinary nature of the urban challenges we face today makes it important to create a connection between fundamental research and society-wide implementation - and to connect the different disciplines and stakeholders needed to solve them. In light of this, living labs are our guiding principle and the approach is fundamental to everything we do. Living labs provide a co-innovative setting, in which multiple stakeholders jointly test, develop and create metropolitan solutions.

From science to implementation

The goal within these living labs is to make impact by developing new products on a small scale – be it an object, a service, a technology, an application, or a system – and to find solutions that can be implemented on larger scales. This is done in a real-life and co-creating setting in which different stakeholders shape the innovation process: users, private and public actors, and academics. In the process, the feedback gathered from use and evaluation of the product is used to accelerate development. As the product is implemented in a real-life setting and validated by the actors, it is more likely to be adopted smoothly and swiftly by all involved, and subsequently have a significant and rapid impact in the city.

"Urban innovation requires urban experimentation. Living labs enable us to do this and work towards real-life, scalable solutions."

Kenneth Heijns, *Managing Director, AMS Institute*



For more information on our Urban Living Lab methodology:
ams-institute.org/livinglabs

Amsterdam as a Living Lab

ATELIER
Transforming neighborhoods in Amsterdam and Bilbao into 'Energy Positive Districts'

DGTL
Illuminating NDSM

HavenStad
Implementing sustainability and circularity in Haven-Stad

WASCOM
From urban waste to urban materials

SUMMALab
Learning space connecting Dutch living labs on urban mobility

Urban Fashion Games
Guide to talking trash: circular textiles

Inspirational Demonstration Garden
Roadmap to make the area more rainproof

Accenture
An online platform for local renewable energy organizations

PLGRND City
Rethinking bulk waste in Venserpolder

Work Space Urban Energy Zuidoost
Setting up exponentially scalable renovation and system transition towards an energy neutral district

Living Lab Marineterrein Amsterdam
Inner-city testground for a sustainable living environment

Sodar
Measurement of windspeeds using sonar techniques

Cinderela
Transforming urine into nutrient-rich fertilizer

Concretely Circular
Recycled concrete objects for public space (MADE project)

Roboat
World's first fleet of autonomous boats

Boombrix
Using IoT sensing to provide guidance on tree watering

Olli
Pilot to test an autonomous vehicle

We are involved in several living labs throughout the city. Moreover, AMS Institute itself is located at Marineterrein Amsterdam. Together with, among others, Bureau Marineterrein, we are developing this area into the Marineterrein Amsterdam Living Lab (MALL). Besides doing multiple research projects, the MSc MADE students are also connected to our network to set-up various living labs as part of their graduation courses.

- **Research & Innovation projects**
- **Entrepeneurship**
- **MADE Living Labs**

Marineterrein Amsterdam Living Lab

The Marineterrein Amsterdam Living Lab (MALL) was launched simultaneously with the opening of our new building. MALL will become available to research, experiment and test in a real-life setting. The main goal is to develop scalable innovations that make and keep cities livable.

Our launching partners: Marineterrein Amsterdam, Amsterdam Smart City / Amsterdam Economic Board, NEMO

Amsterdam's 'Bridges and Quay walls' challenges

In October, 140 business and knowledge institute representatives discussed and demonstrated how Monitoring & Sensoring technologies can be applied to help maintain 200 km of quay walls and 850 bridges in Amsterdam. Stakeholders will be selected to set up a Monitoring & Sensoring Living Lab.

Olli: testing autonomous vehicles

Could self-driving cars offer solutions for Amsterdam's mobility challenges? To find out, we will run a 3-month pilot with Olli, an autonomous vehicle, at Marineterrein. To kick-off this test, together with the Municipality, Local Motors, Transport Authority Amsterdam and GVB, we signed a collaboration agreement end of 2019.

"Two hundred kilometers of quay walls and 850 bridges are to be investigated. The current aim of the City of Amsterdam is to have these renewed or maintained twenty times as fast as the current rate. To achieve this, we need to innovate our current monitoring methodology."

Casper van der Peet, *Technical Manager Monitoring Bridges and Quay Walls, City of Amsterdam*

Illuminating the NDSM wharf

After discussions with residents, entrepreneurs, experts, DGTL festival and the NDSM wharf Foundation, 3 MSc MADE students developed two 4.5m tall innovative, movable light objects with a multifunctional purpose: to serve as atmospheric lighting during the DGTL festival and to contribute to the safety of the area.

Converting Wastewater into Composites (WASCOM)

5 MSc MADE students developed a product with an urban application from a new material produced from waste-water bio-composites from the city. Their prototype result were a flower planter and laptop stand.

Boombrix

Boombrix is a startup founded by two MSc MADE students: Noelle Teh and Jakub Supera. Their idea for ‘trees in need’ originated during a MADE course. They joined the Start-up in Residence program and tested their Boombrix prototype at Marineterrein Amsterdam.

Concretely Circular

Concrete is one of the largest waste streams. Students looked into the whole value chain in a material flow analysis and ways to ‘upcycle’ this material into new products for public space. The objects, table tennis table and chess game, have found a permanent spot at Marineterrein Amsterdam. The students also developed a website and a board game to contribute to the process of circular decision making for stakeholders in the concrete industry.

“Our students can be very proud of the challenges they tackled and the products they’ve delivered. It has been an amazing living lab journey to witness!”

Toine Andernach, *Coordinator MSc MADE, AMS Institute*

AMS Institute: designing solutions for urban challenges

Engaging and developing the latest technology and science with research, experiments and projects in the city of Amsterdam, AMS Institute takes on the challenges posed by our rapidly urbanizing world. The institute wants to develop a deep understanding of the city – sense the city – to design solutions for its challenges, and integrate these into the city of Amsterdam.

The institute's three core domains

Urban Energy

Design integrated innovations that help establish sustainable and resilient energy systems, for example synergies between energy transition and urban (re-)development.

Kattenburgerstraat 7
Marineterrein Amsterdam

Collaboration

AMS Institute is an ambitious institute at the forefront of innovation, and works closely with industry, government, academia and the citizens of Amsterdam.

Our activities result in:

Knowledge
Start-ups
Talent
Solutions
Spin-outs
Impact

Focus on Six Urban Challenges

Smart Urban Mobility

Ensure an accessible and liveable city by developing smart and sustainable and seamless mobility solutions that can be integrated into the urban fabric.

Climate Resilient Cities

Build preparedness and resilience by reducing cities' weaknesses and the impact of climate change: environmental, health related and societal.

Metropolitan Food Systems

Create inspiring scenarios to make food systems more sustainable and future-proof, by focusing on core elements such as: economic development, health, mobility and regional attractiveness.

Amsterdam as a Living Lab

What makes AMS Institute unique is that we valorize our research through practice, using the city of Amsterdam as a living lab: a valuable context for experiments that helps develop and test advanced solutions for challenges in urbanized metropolitan areas around the globe.

Responsible Urban Digitization

Mobilize new analytical tools to better use urban (big) data and improve city life, while strengthening and safeguarding the democratic values of citizens and society.

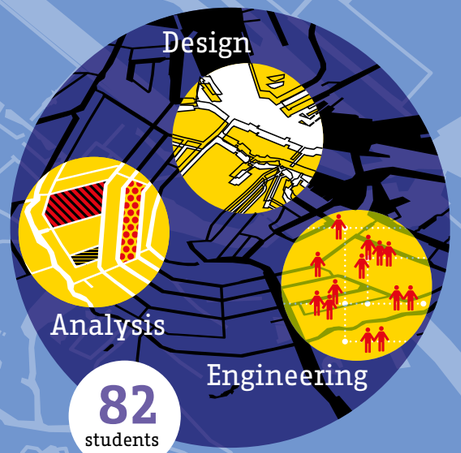
The solutions we develop can be used for cities worldwide

MSc MADE

A joint master's program offered by Delft University of Technology and Wageningen University & Research, using the city of Amsterdam as a case study and living lab via AMS Institute.

Circularity in Urban Regions

Re-design resource flows that drive urban activities, whilst establishing integral sustainable urban ecosystems, supported by a new, resilient economic model.



82 students

Education

Education is essential to gain a deep understanding of our urban environments as well as to develop solid solutions for the cities of today and tomorrow. In 2019, AMS Institute continued to develop its educational activities – ranging from our MSc MADE, summer schools, MOOCs, and professional education. As always, our educational activities were geared towards accelerating transformations through iterative, co-creative learning to create sustainable, resilient and just cities. And, what better way than to utilize Amsterdam as a living lab to foster and develop the research, design and innovation skills of our (future) urban engineers?

MSc MADE

The Metropolitan Analysis, Design & Engineering master program (MSc MADE) forms the core of AMS Institute's educational activities. MSc MADE brings multidisciplinary teams of students together in Amsterdam to address questions such as:

- How can we keep our cities connected?
- How can urban environments safeguard their vitality?
- How can we create truly circular cities?

This two-year master program is a combination of in-situ and online education. It provides students with thorough training in academic skills and project work, while simultaneously connecting them to AMS Institute's research portfolio and our network of business and societal partners.

First engineering degrees in Amsterdam in 450 years

In 2017, the first 18 students started their MADE master with classes on metropolitan challenges, entrepreneurial skills and data analysis in the urban context. This year, the first cohort of MSc MADE students has graduated! What makes this extra special: these are the first engineering degrees that are handed out in the city of Amsterdam in over 450 years.

"MADE has not only provided new insights, knowledge and expertise, but also the freedom to specialize in specific subjects. For me this was in the field of energy transition. As a result, I look forward to a very promising and enjoyable career and to developing solutions on the topic of energy transition together with stakeholders from the energy sector."

Marjolein ten Haaft, *MSc MADE alumna*

"The MSc MADE included a lot of multi- and interdisciplinary work, which I have always very much enjoyed and it challenges me to get the most out of ideas and solutions together with others."

Nono Leermakers, *MSc MADE alumna*

Living Lab Expo

The Living Lab course is part of the MSc MADE graduation year. During this course, the students are connected to partners in AMS Institute's network allowing them to gain Living Lab experience in a real-life setting. The students present their result in an exhibition.

New MOOC: Nature-based Metropolitan Solutions

How can ecosystems contribute to quality of life and a more livable, healthier and more resilient urban environment? In May, our latest and third MOOC was launched. During this course participants discover the potential benefits of nature-based solutions (NBS) in metropolitan areas and develop strategies for their implementation.

"These students are true entrepreneurs. Kicking off the MADE master as the first cohort of students, as well as the way they worked on their living lab assignments to create innovative solutions for the real-life challenges of the city of Amsterdam."

Kenneth Heijns, *Managing Director, AMS Institute*

Learn about all Living Lab projects of our MADE students:
ams-institute.org/livinglabexpo

Research & Innovation

It is revolutions in new technologies, research and design methods that come up with solutions for the challenges our cities are facing, e.g. related to mobility or climate challenges. Our research portfolio revolves around six urban challenges to create an innovative, sustainable and just city. We run over 100 research projects. All are defined and executed by interdisciplinary consortia of knowledge institutes, public and private partners, and in close collaboration with the City of Amsterdam. By involving all relevant stakeholders, we aim to contribute to the development and implementation of sustainable solutions that guarantee livability and accessibility of the Amsterdam Metropolitan Area (AMA).

Smart Urban Mobility

Ambitions City of Amsterdam

1 To be the world's number 1 smart mobility city; this includes exploring the use of 'shared mobility options' and inclusive, clean and healthy transportation, with extra attention for vulnerable groups and areas where accessibility is under pressure;
2 To make travel cleaner and smarter for all Amsterdammers, visitors and goods by providing attractive choices and affordable and clean alternatives;
3 To further develop the city's traffic center digitally – and centrally – in order to manage, analyze, predict and manage mobility flows in real time.

9M tourists in 2019
32M tourists in 2030

5 city bridges closed for maintenance in 2019

Up to **39%** increase in daily trips to, from and in Amsterdam by 2030

1.4M metro passengers per week in 2019

200km quays and **850** bridges to be assessed

AMS Institute's ambitions

The Smart Urban Mobility program explores the feasibility and impact on the city of concepts such as autonomous driving and user-driven Mobility as a Service. The program aims to develop tools and solutions that enhance the (re)design of public spaces and improve the use of existing transport infrastructures. Ultimately, to alleviate pressure on urban mobility and contribute to better mobility flows.

Roboat: autonomous boats in Amsterdam's canals

Together with MIT, AMS Institute is developing the world's first fleet of autonomous boats for Amsterdam. The concept of Roboat can alleviate pressure from the busy city center. Use cases and designs are explored and researched to use Roboat e.g. in the fields of waste logistics and transporting people.

In its third year of research, the technical and functional capabilities of the fleet of autonomous boats were improved. With a focus on latching capabilities and 'shapeshifting'; where the boats autonomously reassemble into various configurations.

Project lead: AMS PI Prof. Carlo Ratti (MIT)
Partners: MIT, TU Delft, WUR, Waternet
Total budget: €25M
Duration: 5 years
Press – Total Media Value: €5.7M

Want to learn how and when we're moving towards a full-scale prototype?
ams-institute.org/roboaty3results

CriticalMaaS: exploring the impact of new mobility services

The shared economy can revolutionize urban mobility. By blurring the traditional division between private and public transport and by shifting from traditional ownership models towards more flexible on-demand services that do not require owning a vehicle. CriticalMaaS is devoted to the development of network, operations and behavioral concepts, theories and models for the emergence of ride-sharing, ride-sourcing and e-hailing services.

How will new mobility services, like Uber and ViaVan, co-exist with conventional public transport? What are the effects on urban challenges like congestion? During the MaaS@AMS event, (inter)national experts, from the City of Amsterdam, Uber, ViaVan, and University College London, shared their experiences, vision, findings, and plans in relation to Mobility as a Service (MaaS) and its consequences for urban mobility.

"There is no way that cities can survive the next wave of transportation growth, without pulling everyone into shared services and shared modalities."

Yariv Hauer, *General Manager, ViaVan*

"By applying Roboat in a city like Amsterdam with busy canals we have a great opportunity to improve the control system for autonomous navigation in urban environments. This is something that has not been shown before in other projects for autonomous vessels."

Carlo Ratti, *AMS PI Prof. and Director, MIT Senseable City Lab*

Curious about our other Smart Urban Mobility projects?
ams-institute.org/smarturbanmobility

Circularity in Urban Regions

Ambitions City of Amsterdam

By 2030 the City of Amsterdam aims to decrease the use of primary raw materials by 50%. Ultimately, the City has committed to becoming fully circular by 2050. Here, the focus lies on resources that drive urban activities, such as building materials, water, food and energy.

AMS Institute's ambitions

Circularity in Urban Regions focuses on re-designing the resource flows that drive urban activities. Think building materials, water, food and energy – the goal is reuse these resources rather than dispose of them. Simultaneously, the concept of circularity asks us to establish integrated and sustainable urban ecosystems supported by a new, resilient economic model. Therefore, we aim to accelerate the transition from a linear to a circular model of resource management in the Amsterdam Metropolitan Area.

Resource Management in Peri-Urban Areas (REPAiR)

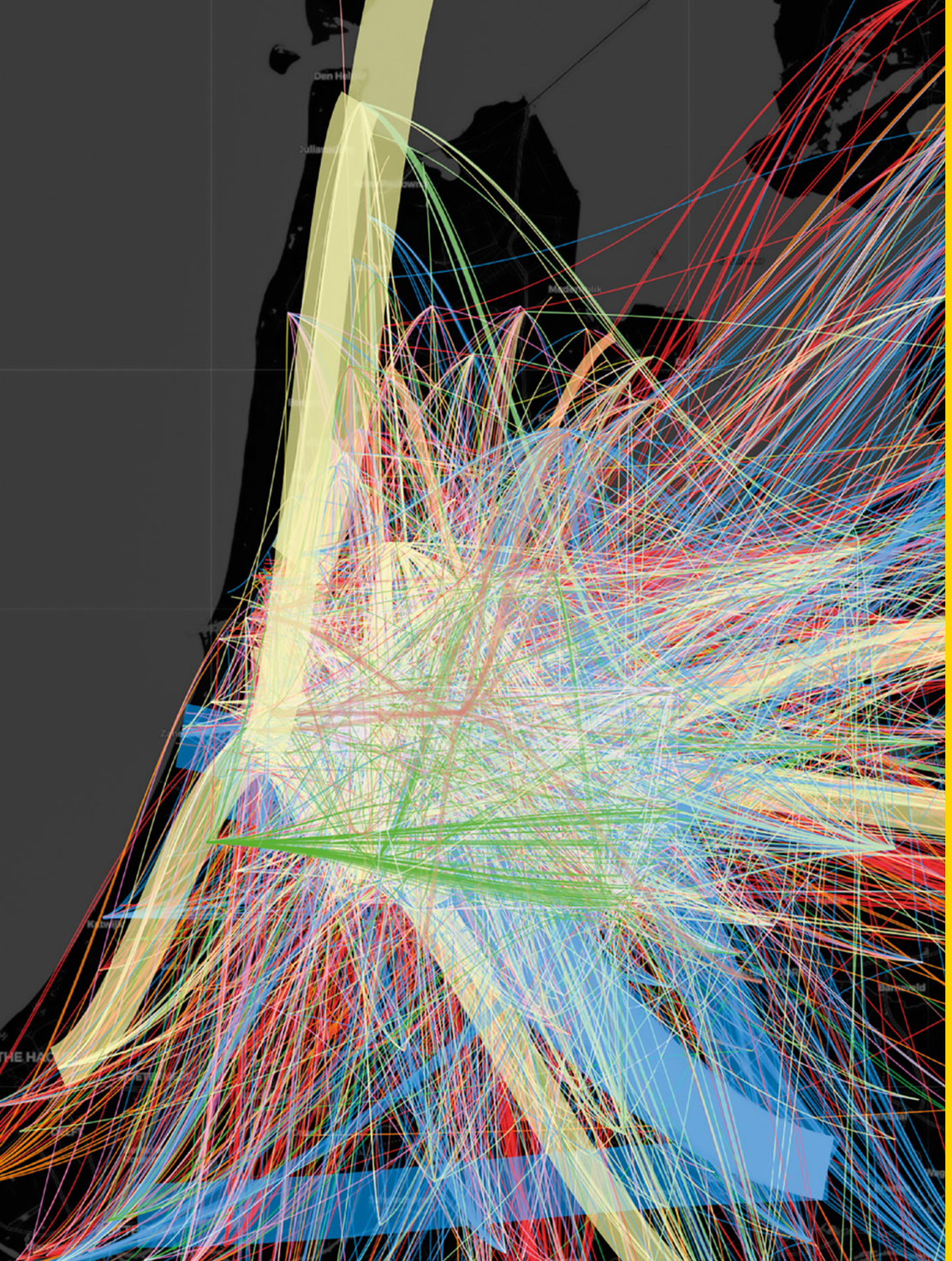
Shifting towards a circular economy is crucial for sustainable and inclusive growth. So, how could local and regional authorities reduce the number of waste flows in terms of import and export? The REPAiR project helps local and regional authorities to reduce waste flows in six peri-urban European areas by devising tools and strategies.

The core objective of REPAiR is to provide local and regional authorities with an innovative and transdisciplinary open source geo-design decision- support environment (GDSE) developed and implemented in living labs in six metropolitan areas. The GDSE allows for creating integrated, place-based eco-innovative spatial development strategies aiming at a quantitative reduction of waste flows in the strategic interface of peri-urban areas. These strategies will promote the use of waste as a resource, thus supporting the ongoing initiatives of the European Commission towards establishing a strong circular economy.

Project Lead: Prof. Arjan van Timmeren (TU Delft)
Partners: TU Delft, Delta, GeoCol, Municipality of Haarlemmermeer, City of Amsterdam, Ghent University, DiARC UNINA, Naples Federico II, HafenCity University Hamburg, Institute for Regional Studies CERS of HAS, MTA KRTK, Institute of Geography and Spatial Organization Polish Academy of Sciences, JRC, BIOKOM Nonprofit Ltd, Gertz Gutsche Rümenapp Stadtentwicklung und Mobilität GbR, OVAM - Public Waste Agency of Flanders, Campania Regional Authority, Pheno horizon, Bauer Umwelt GmbH, IVAGO Flandres, Stadtreinigung Hamburg.
Total budget: €5.1M
Duration: 4 years

"Local information needs are included for each metropolitan region. For Amsterdam, this means we have mapped construction and demolition waste flows, while for Naples the priority was on the transformation of polluted land. The tool gives at- a-glance information about where the causes and consequences can be found."

Alexander Wandl, *Scientific Coordinator of REPAiR, TU Delft*



geoFluxus: an open-source platform to map waste flows

For the REPAiR project, researchers focused on mapping streams of food and construction & demolition waste in Living Labs across six European countries. One of the project results is an open-source online platform: geoFluxus. Using geoFluxus, incomprehensible waste data tables – including import and export and treatment methods – are converted intro comprehensible maps and graphs. This provides valuable knowledge for cities worldwide to develop and test spatial strategies, before actually implementing them. In addition, geoFluxus takes on a 'match-making' role: it provides insights into available industrial materials from other actors close by to re-use these instead of transporting the materials for waste treatment outside the AMA.

Arnout Sabbe (Program Developer at AMS Institute and TU Delft PhD candidate) and Rusne Sileryte (TU Delft PhD candidate) founded the spin off company 'geoFluxus' in 2019, which has also been admitted to Techstars Accelerator.

Project lead: Arnout Sabbe (TU Delft), Rusne Sileryte (TU Delft), Alexander Wandl (TU Delft), Prof. Arjan van Timmeren (AMS Institute/TU Delft).
Partners: TU Delft, geoFluxus is an academic spin-off company based on research projects REPAiR and CINDERELA funded by European Union's H2020 Research and Innovation programme.

"geoFluxus already proved to be of great value. Local and regional authorities in both Europe and the United States can't wait to start using it."

Arjan van Timmeren, *Scientific Director, AMS Institute*

Excited to learn about our other Circularity in Urban Regions projects?
ams-institute.org/circularity

Metropolitan Food Systems

Ambitions City of Amsterdam

1 Reduce food waste by half by 2030;
2 Stimulate growing/production of food in the city;
3 Stimulate the production of sustainable food in agricultural areas around the city;
4 Enhance the share of healthy and sustainable food in food consumption;
5 Stimulate a sustainable food circle;
6 Promote knowledge exchange with regard to food.

AMS Institute's ambitions

In our Metropolitan Food Systems program we explore whether and how Amsterdam can produce one fifth of the food consumed by its citizens. This program tackles three basic aspects of the food supply chain:

1 urban food production;
2 local-to-local food distribution, and;
3 diet of urban consumers.

The results of these investigations are used in research that employs design-scenario-building and evaluation thereof.

Urban Food Strategies: sustainability potential for Almere

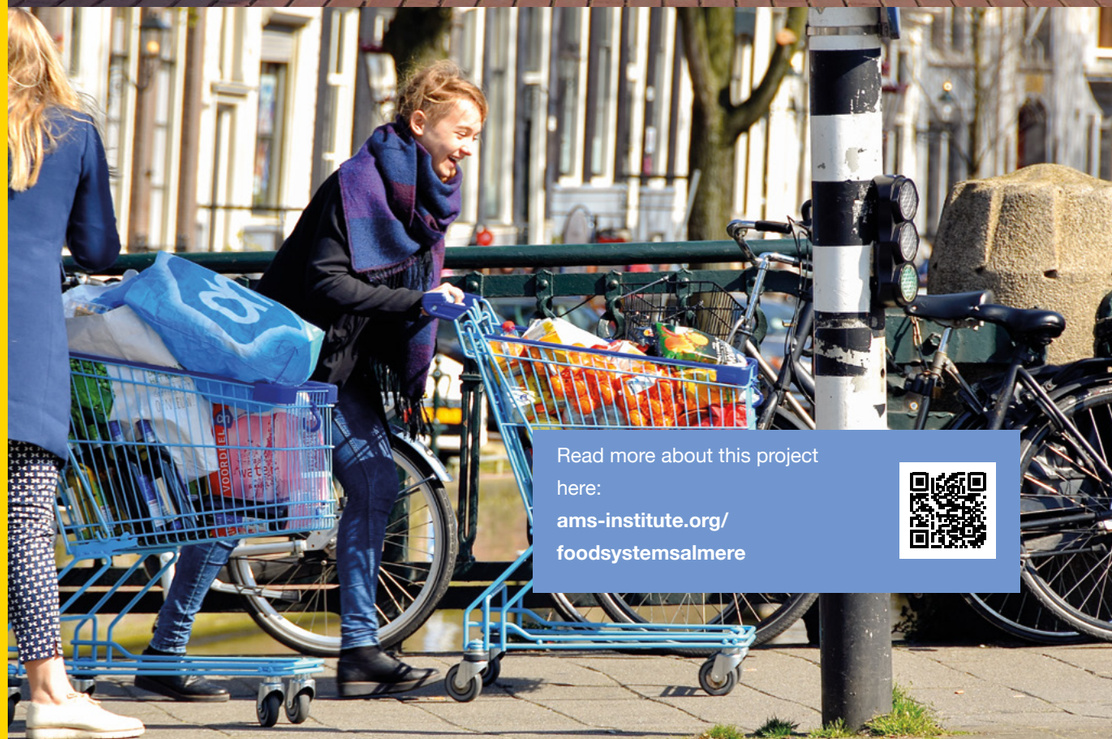
Urban areas are hotspots of food consumption. How could we support cities in becoming responsible geographies in the global food system? Combining forces, MSc MADE student Rianne Stelwagen and WUR PhD candidate in Ecological Economics Liesbeth de Schutter explore the food system of the city of Almere - which is spatially connected to the AMA - to identify the sustainability potential of urban food strategies in the Amsterdam Metropolitan Area (AMA).

As a whole, this project allows the spatial analysis of resource use, socio-economic outcomes and related environmental impacts of Almere's food system in a quantitative approach and assessment tool. In particular, urban-rural linkages with the province of Flevoland - as a regional provider of food products in the AMA - have been highlighted and sustainability potential of regional food strategies have been assessed in the context of urbanization. A quantitative tool is developed to support cities in becoming responsible geographies in the food system.

Project lead: AMS PI Prof. Eveline van Leeuwen (WUR)
Partners: WUR, Flevo Campus, Aeres University of Applied Sciences, Vienna University of Economics & Business
Total budget: €165.6K
Duration: 1 year

"Major challenges, such as the energy transition and a circular society, can only be dealt with if cities and rural areas join forces on an equal basis. For that, we need to better understand socio-economic differences, interactions and synergies."

Eveline van Leeuwen, *AMS PI Prof. Urban Economics, WUR*



Read more about this project here:
ams-institute.org/foodsystemsalmere

Ambitions City of Amsterdam

The City of Amsterdam aims to become climate-neutral by 2050. More specifically, in 2050, CO2 emissions must be 95% lower compared to emissions in 1990.

Climate Resilient Cities

AMS Institute's ambitions

The Climate Resilient Cities program aims to create a climate adaptation planning approach that carefully designs and assesses interventions such as greening and the sustainable (re)design and maintenance of the city's infrastructure. This is reached by evaluating the functioning, adaptation and resilience of climate systems. The entire urban air-water-soil-green system is analyzed to map rainfall, temperatures and wind turbulence in and around Amsterdam.

Amsterdam Atmospheric Monitoring Supersite (AAMS)

By setting up a meteorological network with 30 weather stations, the goal of the Amsterdam Atmospheric Monitoring Supersite (AAMS) is to increase our understanding of local weather, climate and air to help improve local hydrology, air quality and citizens' health.

During the heatwave in July, we launched weather balloons from Dam Square to expand the city's weather models with vertical measurements. For a period of 24 hours, every 2 hours, a total of 12 weather balloons measured to what height the heat in the city differs measurably from the temperatures outside the city, also known as the 'urban heat island'. The results? In the evening the heat of the city impacted temperatures up to a height of 120 meters (about 50 storeys high). Also, at night it remained 3.4 degrees Celsius warmer in the city compared to the countryside.

The measurements on Dam Square created a buzz in the Dutch media. With exposure in: NRC Handelsblad, Het Parool, NOS, RTL Nieuws.

Project lead: Bert Heusinkveld (WUR) and Gert-Jan Steeneveld (WUR)
Partners: WUR
Total budget: €1.5M
Duration: 4 years

"It is often underestimated how much impact heat stress has on, for example, the vitality and productivity of inhabitants. Understanding the urban climate and the predictability of a city's weather profile is therefore becoming increasingly important."

Gerben Mol, *Program Developer Climate Resilient Cities, AMS Institute*

Amsterdam's Bridges and Quay Walls

As part of its duty to keep the city safe, accessible and 'future-proof', the City of Amsterdam has developed the 'Bridges and Quay Walls' Action Plan. One of the challenges the City faces is that for many bridges and quays there are insufficient records of the composition of the soil around them; an important factor that determines the state of the bridges and quays. Therefore, together with TU Delft, we are involved in assisting the municipality of Amsterdam in order to take steps that provide a better view of the structure and subsurface conditions of the quay walls. The aim is to tackle the urgent task to mitigate the unsafe conditions with appropriate technical solutions.

Together with the City, we started setting up the Living Lab Monitoring & Sensoring aimed at testing, accessing and upscaling new innovative techniques to tackle the bridges and quay walls challenges in Amsterdam. As part of this Living Lab, two research projects kicked-off this year that can provide outcomes on how to manage a large area of quay walls and bridges in Amsterdam in a smart way. In short, these projects focus on:

1 Ground imaging techniques to detect subsurface objects, changes in material properties, soil composition, and voids and cracks.
2 'Proven Strength' as a methodology.

Project leads: Mart-Jan Hemel (TU Delft), Pantelis Karamitopoulos (TU Delft)
Partners: TU Delft, City of Amsterdam
Total budget: €2M
Duration: 2 years

"While the historic quay walls in Amsterdam are becoming older and weaker, the usage of these 'hydraulic structures' continues to rise. Engineers will have to come up with creative and practical solutions to tackle this problem."

Mart-Jan Hemel, *Research Fellow Civil Engineering & Geosciences, AMS Institute*

Curious what other projects we work on to adapt the city to climate change consequences?
ams-institute.org/resilientcities

Urban Energy

Ambitions City of Amsterdam

The City of Amsterdam has the ambition to become ‘climate-neutral’, i.e. reduce CO2 emissions by 55% by 2030, and by 95% by 2050 – with 1990 as a benchmark. This requires major transformations of the current energy system. Therefore, the City has set out four theme-specific ambitions:

1 The built environment: The City wants to eliminate the use of natural gas by 2040.
2 Traffic and transport: In 2030, all traffic on our Amsterdam roads and water should be emission-free.
3 Electricity: The City’s production of sustainable electricity should be maximized. For example, by 2030, 80% of the electricity that households use should be generated from solar and wind energy.
4 The port and industry: By 2050, the port of Amsterdam will be a fully sustainable energy and fuel cluster with green hydrogen, biofuels and synthetic fuels. The City aims to phase out fossil fuels by 2050.

3,267 public car charging points and **21** fast chargers in 2019

250MW solar energy and **17MW** wind energy in Amsterdam by 2022

Charging an electric car equals **2 to 3** days of energy usage of an average household

With current grid capacity frequent blackouts are expected once **10%** of Amsterdam households charge electric cars

AMS Institute’s ambitions

What is the best way to ensure a sustainable, affordable and reliable energy system for the Amsterdam region? That’s the main question our Urban Energy program aims to answer. In our energy projects, we explore how best to deal with increased variability in consumption, storage and production on multiple scales. Ultimately, our goal is to help design smart infrastructures that contribute to accelerating Amsterdam’s urban energy transition.

Assessing the potential of solar panels considering local grid infrastructure

Currently, the municipality and house owners are not fully aware of the real PV potential of their roof-tops and of the challenges they will face when exchanging energy with the low voltage grid. Therefore, in this project an accurate PV potential map is created, indicating the maximum possible PV energy yield per building, considering all surfaces receiving sufficiently high irradiation. Furthermore, a grid impact model will test how much generated power the grid can actually receive from each building cluster, before problems arise for the relevant grid components.

We also consider additional conflicting aspects for PV adoption, like concurrent roof purposes (e.g. roof terraces), as well as natural installation moments, for example a planned roof reconstruction.

Project lead: Maarten Verkou (TU Delft)
Partners: TU Delft
Duration: 1 year exploration

"The main outcome from this project will be a PV installation calendar, indicating the ideal time for building clusters to start implementation of PV systems in certain districts of the city. A 3D visualization will show how the city appearance will change over the years with increasing PV penetration levels."

Maarten Verkou, *Research Fellow Sustainable Energy Technology, AMS Institute*

AmsTErdam BiLbao cItizen drivEn smaRt cities (ATELIER)

What if we could generate more energy rather than is consumed? In the ATELIER project, Buiksloterham in Amsterdam and Zorrotzaurre in Bilbao, are transformed into ‘Positive Energy Districts’ (PEDs) by implementing innovative solutions. One aim is to create and replicate successfully implemented solutions in six other European cities. Within this project, our role is to provide our Living Lab expertise.

Innovation Ateliers are set up in Bilbao and Amsterdam, respectively in the areas of Zorrotzaurre and Buiksloterham, with the aim of distilling an ‘Innovation Atelier plan of approach’. More specifically, we do this a) by monitoring the development process of the Innovation Ateliers over the duration of five years based on our Living Lab approach and b) by monitoring what impact the Innovation Ateliers have on the projects in these cities.

Project lead: City of Amsterdam
Partners: City of Amsterdam, City of Bilbao, Tecnalia, TNO, Cartif, Waag Society, Amsterdam University of Applied Sciences, Paul Scherrer Institute Steinbeis-Europa-Zentrum, City of Budapest, City of Matosinhos, City of Riga, City of Copenhagen, City of Bratislava, City of Krakow, DeustoTech, Cluster De Energía, IBERDROLA, Telur Geotermia y Agua, EVE, SPECTRAL, Republica VOF, Waternet, DNV GL, Greenchoice, CiviESCo, Zabala Innovation Consulting, Fraunhofer ITWM
Total budget: €495K
Duration: 5 years

“We are excited to build these ‘Positive Energy Districts’ in eight European cities together with 29 European parties, including municipalities, knowledge institutes and companies.”

Leendert Verhoef, *Program Lead Living Labs, AMS Institute*

Learn more about our other Smart Urban Energy projects:
ams-institute.org/urbanenergy

Responsible Urban Digitization

Ambitions City of Amsterdam

1 Free digital city: The ambition is to consciously deal with the opportunities and threats of digital technologies, to ensure protection of civil rights and fair access to and fair distribution of the proceeds of digital technologies. Companies must adhere to the rules in the field of data and technology;
2 Inclusive digital city: Technology must help all Amsterdammers to participate in city activities and become digitally resilient. Digitization should provide access to all kinds of information and education;
3 Creative digital city: Together with the city, digitization is used to contribute to solving social challenges, to put (ethical) issues around technology on the agenda and to make them public. Another aim is cooperation with other (inter)national cities.

200+
cameras in Amsterdam public space

1200
license plates/hr checked by scan cars; 17 times more than civil servants by foot/scooter

€30M
revenues from fines by scan cars in 2018; an increase of 61% vs. 2013

AMS Institute's ambitions

In our Responsible Urban Digitization program, we research, develop and integrate advanced and novel (data science) tools and technologies to improve the quality of life in the city and work on solving urban challenges. Simultaneously, our goal is to embed and safeguard the societal values that are intertwined with – and in the design of – these innovations. Think autonomy, privacy, transparency, inclusiveness and empowerment.

Designing the Human Scan Car

Scan cars – vehicles that are equipped with sensors to collect data on the urban environment – are becoming increasingly smart to improve efficiency and help the municipality carry out tasks, such as parking policy enforcement and waste registration. In this project we explored what public and democratic values should be embedded in the implementation of these scan cars.

What features could make scan cars more ‘human’? This was the main question during a three-part design sprint we held this year with UNSense, the City of Amsterdam, TADA and TU Delft. The result: four designs that include features that could make these vehicles (more) transparent, understandable or even contestable by citizens. To get a full impression of the design sprint, you’re welcome to download this booklet: ams-institute.org/humanscancar

Project lead: AMS PI Prof. Gerd Kortuem (TU Delft)
Partners: UNSense, City of Amsterdam and Rotterdam, TADA and TU Delft
Total budget: €20K
Duration: 2 months

“Design should play a role in guiding the perceptions of, and interactions with, automated sensing systems in the city. Going through this process with AMS Institute’s researchers and public servants, we’ll be able to bend the design towards a more consciously chosen, collectively desirable future.”

Tessa Steenkamp, *Sensorial Experience Designer, UNSense*

Want to keep an eye on what other technologies we explore? **ams-institute.org/responsibleurbandigitization**

Entrepreneur-ship

AMS Institute is strongly committed to helping the next generation of ambitious urban and sustainable entrepreneurs turn their ideas into reality: from challenging these entrepreneurial spirits to pitch their business ideas to a jury of experts and launch their start-up to issuing an open invitation to develop solutions for the urban challenges the City of Amsterdam is facing. Ideas that can transform into business opportunities and at the same time accelerate transformations in our urban environments – talk about a win-win!

A 24h ‘marathon’ to generate solutions for the city

During the Amsterdam City Challenge everyone with a sustainable and innovative mindset was invited to join a 24-hour citizen-driven pressure cooker. The City of Amsterdam brought two important topics to the table that could use some fresh perspectives: mobility and the energy transition. In only 24 hours the participants developed bright and bold ideas for a sustainable future.

The ClimateLaunchpad to launch new business ideas

A new generation of climate entrepreneurs, eager to make a difference, joined the AMS ClimateLaunchpad in June. After that, ten teams pitched their business ideas to a jury of experts in the National Final in September. MSc MADE students had the opportunity to win a wildcard to join the competition. After the competition two of the participating teams made the cut for follow-up accelerator programs.

“AMS ClimateLaunchpad really helped to get us to the stage we wanted: pitching in front of an expert jury and a wide audience of interested stakeholders. Furthermore, thanks to ClimateLaunchpad, we got in touch with the ‘Arcadis City of 2030 Accelerator, Powered by Techstars’, one of the world’s leading accelerator programs, which we are now participating in!”

Team geoFluxus, *National finalist 2019*

“Ingredients for a successful Amsterdam City Challenge: 24-hours of non-stop ideating, uncovering insights, fun, 45 young bright minds in 8 multi-disciplinary teams.”

Marije Wassenaar, *Program Manager New Business Innovations, AMS Institute*

Curious how these talented teams accelerate sustainability in cities?
ams-institute.org/climatelaunchpad

Urban Data Science

Cities are extremely data-rich environments. Technologies like artificial intelligence, robotics, big data, and sensors are increasingly used by the City of Amsterdam. We believe data is a valuable catalyst to gain new insights into our urban environments. AMS Institute aims to enhance the findability, accessibility, interoperability, and reuse of the city's digital assets.
Therefore, our goal is to work with cross-domain experts to develop and study novel methods and tools for social urban data processing that are fair, accurate, and accountable. Ultimately, to create solutions that enable better urban planning and decision making to transform metropolitan areas in a transparent and evidence-based way.

A data-driven perspective to address urban challenges

Our Urban Data Science team develops the in-house competences and infrastructure required to conduct data-driven experiments and studies on urban challenges. They also manage the resulting digital assets, such as data and software. More specifically, AMS Institute designs and develops novel computational methods and tools for the acquisition, integration, visualization, and exploratory analysis of time-varying, dynamic and large urban datasets. This work contributes to an increased understanding of the metropolitan challenges we address. The team also actively supports AMS partners with off-the-shelf technological and methodological solutions and contributes to AMS research and education-related topics.

Data Visualization Lab

Humans are visual creatures and, as such, process visual information much faster than they process text, audio and other modalities. Human beings are also able to detect patterns and anomalies with the blink of an eye. Data visualization makes use of these strong visual capabilities by representing data graphically.

Our Data Visualization Lab therefore develops state-of-the-art technology for the visualization and sense-making of social urban data. In turn, data becomes more accessible, understandable and actionable.

The Data Visualization team also seeks collaboration with others: for instance, exploring projection mapping in data visualization with the design agency Clever°Franke and Chief Technology Office (CTO) of the Municipality of Amsterdam.

Examples of urban challenges addressed by the Urban Data Science team include:

Data Science Course

In 2019 we organized our first AMS professional course on ‘Urban Data Science’, which was held at the new AMS premises. A total of 21 municipal employees, representing the Municipalities of Amsterdam, Rotterdam, and Utrecht successfully attended and completed the course. The course trained professionals (through lectures and hands-on sessions) towards leveraging the full potential of urban data in working on city challenges.

Participants gained insight into the latest developments in urban data science. The topics covered included: advanced spatial analysis with new forms of urban data; machine learning techniques; text analytics; geographic information retrieval; crowdsourcing for cities; urban data visualization.

The city awakes

Did you ever imagine how the city is kept clean and safe, day in and day out? Covering distances of about 6,000km each day, over 1,000 public servants hop in about 700 ‘city vehicles’ solving 280 complaints per day. That’s 45 sweepers, 60 garbage and container trucks, and 600 maintenance vehicles to keep the City of Amsterdam clean and safe.
A visualization was made in collaboration with the CTO Tech Team of the City of Amsterdam and our Data Visualization Lab:
ams-institute.org/datavisualizations

The urban heat-island creates a lid on the city

Our researchers measured that heat takes longer to dissolve in the city versus the countryside: at 10 p.m. sensors on a weather balloon still recorded a temperature of 26.3ºC at the Dam Square whereas the temperature measured at the same time in the countryside was a full 3ºC lower. This visualization shows how the urban heat effect creates ‘a lid on the city’ and impacts the temperature of the atmosphere. In the evening at 10 p.m. the heat of the city still reached a height of 120 meters:
ams-institute.org/urbanheatvisualization

The data visualizations are made by design agency Clever°Franke and our Data Visualization Lab.

“The measurements show that the city has its own influences that cause the urban weather model to differ strongly from the rural weather model. Cities are generally warmer than their surroundings because heat is trapped in bricks, roads and buildings. The city itself also produces a lot of heat. This can have adverse effects on human health, labor productivity, energy consumption, critical infrastructure, air quality and surface water quality.”

Stephan van Dijk, *Director of Innovation, AMS Institute*

Board Report

The board of AMS Institute was founded on August 26, 2014 and is registered with the Amsterdam Chamber of Commerce (KVK 854305610). It consists of four representatives – two from each of our founding partners: Delft University of Technology and Wageningen University & Research.

In 2019, the composition of the AMS Board was as follows:

P.J. Russel	Chair	until August
R. Mazier	Member	until August
	Chair	from September
H.P.S. Althuis	Member	entire year
J.G.A.J. van der Vorst	Member	start July
D.E. van Gameren	Member	start September
H.H.M. Rijnaarts	Member	until June

The board was supported by the executive secretary Saskia Faas until May, and from June Monique Gulickx took over.

The board met ten times to discuss and steer the general development and long-term strategy of AMS Institute. During these meetings, the board made decisions and gave advice on a broad range of topics, including:

- The 2018 Annual Report, the 2019 Quarterly Reports, and the 2020 Budget and Annual Plan.
- The midterm evaluation of AMS Institute and the development of a strategic plan 2020-2024 based on the midterm evaluation report.
- The start of the process for finding a successor for the Scientific Director Prof. van Timmeren
- Approval of new projects and programs and the extension of existing ones, including ‘Roboat’, ‘Fabulous’, ‘Urban Food Strategies: sustainability potential for Almere’, ‘Effectief groen voor klimaatadaptatie’, ‘User Interface for Smart Charging’, ‘UP-WISE meets I surf’, ‘Circularity by Design’, ‘ACTonNBS’, ‘Responsible Sensing Lab’, and ‘EIT Urban Mobility’.

The overall Research & Innovation portfolio reached a grand total of 114 projects with a total value of almost €76M.

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An overview of AMS Institute core domains and focus areas
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Trashcan with plastic
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Supporting structure at one of Amsterdam’s quay walls
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Solar energy powered boat cruising the canals of Amsterdam
Paul Sullivan (Flickr)

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Calculating the annual PV yield for building roof surfaces
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Schoonschip residential area in Amsterdam Noord
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Scan car for parking policy enforcement in Amsterdam
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Glossary

AMA
Amsterdam Metropolitan Area

ATELIER
AmsTErdam BiLbao cItizen drivEn smaRt cities

CERS of HAS / MTA KRTK
Hungarian Academy of Sciences Centre for Economic and Regional Studies

CINDERELA
New Circular Economy Business Model for More Sustainable Urban Construction

CTO
Chief Technology Office

DGTL
DGTL festival

DiARC UNINA
Dipartimento di Architettura - Università degli Studi di Napoli Federico II

GDSE
Geo-design decision-support environment

GVB
Gemeente Vervoerbedrijf

JRC
Europe Joint Research Centre

KiM
Kennisinstituut voor Mobiliteitsbeleid

MaaS
Mobility as a Service

MALL
Marineterrein Amsterdam Living Lab

MIT
Massachusetts Institute of Technology

MOOCs
Massive Open Online Courses

MRA
Metropolitan Region Amsterdam

MSc MADE
Metropolitan Analysis, Design & Engineering

NBS
Nature-based solutions

NDSM
Nederlandsche Dok en Scheepsbouw Maatschappij

PI
Principal Investigator

PV
Photo Voltaic

REPAIR
Resource Management in Peri-Urban Areas

TADA
Tada – data disclosed

Transport Authority Amsterdam
Vervoerregio Amsterdam

TU Delft
Delft University of Technology

WASCOM
Converting Wastewater into Composites

WUR
Wageningen University & Research